Background Information:
The Project 2007-06 System Protection Coordination Standard Drafting Team (SPCSDT) posted an initial draft of the Standard PRC-001-2 on September 11, 2009 for comments. In that draft, the SPCSDT attempted to address the planning and non-operational issues identified in the assessment of PRC-001-1 performed by the NERC System Protection and Control Task Force (SPCTF) as well as the operating time frame issues identified in FERC Order 693. These operating time frame requirements involved detecting Protection System failures, informing operators and taking quick corrective actions; consequently, the SPCSDT transferred the Order 693 directives associated with Requirements R2, R5 and R6 to Project 2007-03 Real-time Operations for inclusion in the revisions of the appropriate operating standards associated within that project. Additionally, the SPCSDT determined that the training aspects of PRC-001-1 Requirement R1 are more appropriately addressed by Reliability Standard PER-005-1 with revision to its Applicability section to include the Generator Operator. Therefore, PRC-001-3 was created to retain Requirement R1 only, as identified in the implementation plan for PRC-027-1. The two remaining requirements, Requirements R3 and R4 of PRC-001-1 address the coordination of new and existing protective systems. These aspects of coordination are incorporated in the proposed standard PRC-027-1 Protection System Coordination for Performance During Faults.

Draft 1 of PRC-027-1 was posted for a 45-day formal comment and initial ballot from May 21 – July 5, 2012. The SPCSDT has responded to stakeholder comments and incorporated pertinent suggestions into the standard. The SPCSDT is presenting the second draft of PRC-027-1 for stakeholder review and comment.

For questions 1-5, please provide specific comments related to the individual question.
You do not have to answer all questions. Enter All Comments in Simple Text Format.

Insert a “check” mark in the appropriate boxes by double-clicking the gray areas.

1. Based on stakeholder comments, the drafting team modified the Purpose of this standard to “To coordinate Protection Systems for Interconnected Elements, such that the least number of power system Elements are isolated to clear Faults.” Do you agree with this Purpose? If not, please provide specific suggestions for change in the comment area.

☐ Yes
☒ No

Comments: By restricting the coverage to “... Interconnected Elements, such that the least number of power system Elements are isolated to clear Faults” there is a significant gap in reliability created by the exclusion of elements such as loss of field, out-of-step, etc. An incomplete Protection System Study negates all the work needed to satisfy this Standard.

Perhaps through referencing the NERC technical reference document entitled “Power Plant and Transmission Protection Coordination”, there could be a reference to which protection elements are going to be covered in this Standard and likewise what Standards will cover the protection elements not covered by this Standard.

As identified by the Drafting Team, there may be no evidence of mis-coordination between traditional protections that detect faults, but for co-ordination of generator loss of excitation protection settings or out of step relaying during a fault condition – is that meant to be covered in this Standard or elsewhere? The latest draft of PRC-019-1 indicates studies conducted under that standard are for steady state conditions, not fault conditions.

PRC-023 provided clear direction on what protection elements to mitigate and even provided options on how to mitigate those elements. PRC-027 should provide the similar effective vehicle to convey at least the “what” for Protection System coordination during faults between entities, and will allow entities to perform and document consistent Protection System Studies.

The term “coordination” is not well defined. Does it mean ensuring owners of all terminals of a line, transformer, etc. are aware of each other’s protection system design and settings, especially when the design, settings, and physical system changes? Developing a formal definition to be included in the NERC Glossary should be considered.
2. The drafting team is proposing two definitions for use only with PRC-027-1 as follows:

**Interconnected Element**: An Element that electrically joins separate Functional Entities, including those Functional Entities that are a part of the same Registered Entity

**Protection System Study**: A study that demonstrates existing or proposed Protection Systems operate in the desired sequence for clearing Faults.

Do you agree with these definitions, if not please provide specific suggestions for change in the comment area.

☐ Yes  ☒ No

Comments: In the proposed definition of Interconnected Element “Functional Entities” is capitalized even though it is not in the NERC Glossary.

3. In Requirement R1, the drafting team modified the time frame to allow entities 48 months to have a documented Protection System Study completed for each Interconnected Element if no Protection System Study exists. Note, the drafting team has allowed inclusion of all previously performed Protection System Studies whose summary of results include, at a minimum, the protective relay settings reviewed, contingencies evaluated, Fault currents used, any issues identified, and any revisions proposed. Do you agree with this approach? If not, please provide specific suggestions for change in the comment area.

☐ Yes  ☒ No

Comments: Due to the extensive documentation, coupled with the collaboration between entities associated with this requirement, NPCC believes 60 months is a more appropriate time frame to comply. This timeframe is also more in line with the timeframe proposed in the draft PRC-019-1 in Project 2007-09.

An alternative to the "static" time frame discussed above, which would also be acceptable, would be to base the timeframe on a formula that factors in the number of interconnected power system elements that the entity must contend with.
4. In Requirement R4, the drafting team replaced the need to ‘reach agreement’ with ‘confirming acceptance.’

Do you agree with this change? If not, please provide specific suggestions for change in the comment area.

☑ Yes
☒ No

Comments: This change is more ambiguous than reach agreement. How can changes to Protection Systems occur unless agreement is reached via a signed off Protection System Study? What does it mean to confirm acceptance?

5. The requirements and associated measures were modified to indicate that information was ‘provided’ instead of ‘demonstrating that each affected entity received notification.’ Do you agree with this change? If not, please provide specific suggestions for change in the comment area.

☐ Yes
☒ No

Comments: We agree with the change.

However, we are adding a comment on the VRFs. The VRFs should be High, not Medium. There are similar requirements in PRC-023-2 Transmission Relay Loadability, and TPL-001-2 Transmission System Planning Performance Requirements which have a High VRF. Also, from the Justification for Proposed Violation Risk Factors and Violation Severity Levels in PRC-027-1 — Protection System Coordination for Performance During Faults, the FERC VRF G4 Discussion reads “Guideline 4- Consistency with NERC Definitions of VRFs: Failure to perform a Protection System Study for each Interconnected Facility to verify that Protection Systems coordinate such that the least number of power system Elements are isolated to clear Faults could directly affect the electrical state or the capability of the Bulk Electric System, or the ability to effectively monitor and control the Bulk Electric System. However, it is unlikely to lead to Bulk Electric System instability, separation, or Cascading failures. The applicable entities are always responsible for maintaining the reliability of the Bulk Electric System, regardless of the situation. Therefore, this Violation Risk Factor level conforms to NERC’s definition of a Medium VRF.” Poor protection system coordination during a disturbance can create severe system conditions faster than Operators can respond to them, leading to system instability or a cascading failure. These circumstances are consistent with the NERC definition of a High VRF.